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**Practitioner's Docket No.** 50622

*PATENT*

JC846 U.S. PTO  
09/723302  
11/27/00

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

**Box Patent Application  
Assistant Commissioner for Patents  
Washington, D.C. 20231**

## **NEW APPLICATION TRANSMITTAL**

Transmitted herewith for filing is the patent application of

**Inventor(s): Brian McDavit, Charles R. Szmanda and James G. Shelnut**

**WARNING:** 37 CFR 1.41(a)(1) points out:

*"(a) A patent is applied for in the name or names of the actual inventor or inventors.*

(1) The inventorship of a nonprovisional application is that inventorship set forth in the oath or declaration as prescribed by § 1.63, except as provided for in § 1.53(d)(4) and § 1.63(d). If an oath or declaration as prescribed by § 1.63 is not filed during the pendency of a nonprovisional application, the inventorship is that inventorship set forth in the application papers filed pursuant to § 1.53(b), unless a petition under this paragraph accompanied by the fee set forth in § 1.17(i) is filed supplying or changing the name or names of the inventor or inventors.”

**For (title): MANUFACTURING PROCESS BILLING SYSTEM**

**CERTIFICATION UNDER 37 C.F.R. 1.10\***

*(Express Mail label number is mandatory.)*

*(Express Mail certification is optional.)*

I hereby certify that this correspondence and the documents referred to as attached therein are being deposited with the United States Postal Service on this date November 27, 2000, in an envelope as "Express Mail Post Office to Addressee," mailing Label Number EK929188029US, addressed to the: Assistant Commissioner for Patents, Washington, D.C. 20231.

Deanna M. Rivernider  
*(type or print name of person mailing paper)*

10. The following table shows the number of hours worked by 1000 workers in a certain industry.

Donna M. Kerec  
Signature of person mailing paper

**WARNING:** Certificate of mailing (first class) or facsimile transmission procedures of 37 C.F.R. 1.8 cannot be used to obtain a date of mailing or transmission for this correspondence.

**\*WARNING:** Each paper or fee filed by "Express Mail" must have the number of the "Express Mail" mailing label placed thereon prior to mailing. 37 C.F.R. 1.10(b).

*"Since the filing of correspondence under § 1.10 without the Express Mail mailing label thereon is an oversight that can be avoided by the exercise of reasonable care, requests for waiver of this requirement will not be granted on petition."* Notice of Oct. 24, 1996, 60 Fed. Reg. 56,439, at 56,442.

## 1. Type of Application

This new application is for a(n)

(check one applicable item below)

- Original (nonprovisional)
- Design
- Plant

**WARNING:** *Do not use this transmittal for a completion in the U.S. of an International Application under 35 U.S.C. 371(c)(4), unless the International Application is being filed as a divisional, continuation or continuation-in-part application.*

**WARNING:** *Do not use this transmittal for the filing of a provisional application*

**NOTE:** *If one of the following 3 items apply, then complete and attach ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF A PRIOR U.S. APPLICATION CLAIMED and a NOTIFICATION IN PARENT APPLICATION OF THE FILING OF THIS CONTINUATION APPLICATION.*

- Divisional.
- Continuation.
- Continuation-in-part (C-I-P).

## 2. Benefit of Prior U.S. Application(s) (35 U.S.C. 119(e), 120, or 121)

**NOTE:** *A nonprovisional application may claim an invention disclosed in one or more prior filed copending nonprovisional applications or copending international applications designating the United States of America. In order for a nonprovisional application to claim the benefit of a prior filed copending nonprovisional application or copending international application designating the United States of America, each prior application must name as an inventor at least one inventor named in the later filed nonprovisional application and disclose the named inventor's invention claimed in at least one claim of the later filed nonprovisional application in the manner provided by the first paragraph of 35 U.S.C. 112. Each prior application must also be:*

- (i) An international application entitled to a filing date in accordance with PCT Article 11 and designating the United States of America; or*
- (ii) Complete as set forth in § 1.51(b); or*
- (iii) Entitled to a filing date as set forth in § 1.53(b) or § 1.53(d) and include the basic filing fee set forth in § 1.16; or*
- (iv) Entitled to a filing date as set forth in § 1.53(b) and have paid therein the processing and retention fee set forth in § 1.21(l) within the time period set forth in § 1.53(f)*

*37 CFR 1.78(a)(1).*

**NOTE** *If the new application being transmitted is a divisional, continuation or a continuation-in-part of a parent case, or where the parent case is an International Application which designated the U.S., or benefit of a prior provisional application is claimed, then check the following item and complete and attach ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED.*

**WARNING:** If an application claims the benefit of the filing date of an earlier filed application under 35 U.S.C. 120, 121 or 365(c), the 20-year term of that application will be based upon the filing date of the earliest U.S. application that the application makes reference to under 35 U.S.C. 120, 121 or 365(c). (35 U.S.C. 154(a)(2) does not take into account, for the determination of the patent term, any application on which priority is claimed under 35 U.S.C. 119, 365(a) or 365(b).) For a c-i-p application, applicant should review whether any claim in the patent that will issue is supported by an earlier application and, if not, the applicant should consider canceling the reference to the earlier filed application. The term of a patent is not based on a claim-by-claim approach. See Notice of April 14, 1995, 60 Fed. Reg. 20,195, at 20,205.

**WARNING:** When the last day of pendency of a provisional application falls on a Saturday, Sunday, or Federal holiday within the District of Columbia, any nonprovisional application claiming benefit of the provisional application must be filed prior to the Saturday, Sunday, or Federal holiday within the District of Columbia. See 37 C.F.R. § 1.78(a)(3).

[ ] The new application being transmitted claims the benefit of prior U.S. application(s). Enclosed are ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED.

### 3. Papers Enclosed

#### A. Required for Filing Date under 37 C.F.R. 1.53(b) (Regular) or 37 C.F.R. 1.153 (Design) Application

9 Pages of Specification (including cover sheet)  
3 Pages of Claims  
1 Sheets of Drawing

[ ] Formal  
[ ] Informal

#### B. Other Papers Enclosed

1 Pages of Abstract  
\_\_\_\_\_  
Other

**WARNING:** DO NOT submit original drawings. A high quality copy of the drawings should be supplied when filing a patent application. The drawings that are submitted to the Office must be on strong, white, smooth, and non-shiny paper and meet the standards according to § 1.84. If corrections to the drawings are necessary, they should be made to the original drawing and a high-quality copy of the corrected original drawing then submitted to the Office. Only one copy is required or desired. For comments on proposed then-new 37 C.F.R. 1.84, see Notice of March 9, 1988 . . . (1990 O.G. 57-62).

**NOTE.** "Identifying indicia, if provided, should include the application number or the title of the invention, inventor's name, docket number (if any), and the name and telephone number of a person to call if the Office is unable to match the drawings to the proper application. This information should be placed on the back of each sheet of drawing a minimum distance of 1.5 cm. (5/8 inch) down from the top of the page." 37 C.F.R. 1.84(c)).

(complete the following, if applicable)

[ ] The enclosed drawing(s) are photograph(s), and there is also attached a "PETITION TO ACCEPT PHOTOGRAPH(S) AS DRAWING(S)." 37 C.F.R. 1.84(b).

#### **4. Additional Papers Enclosed**

- Preliminary Amendment
- Information Disclosure Statement (37 C.F.R. 1.98)
- Form PTO-1449
- Citations
- Declaration of Biological Deposit
- Submission of "Sequence Listing," computer readable copy and/or amendment pertaining thereto for biotechnology invention containing nucleotide and/or amino acid sequence.
- Authorization of Attorney(s) to Accept and Follow Instructions from Representative
- Special Comments
- Other:

#### **5. Declaration or Oath**

**NOTE:** *A newly executed declaration is not required in a continuation or divisional application provided the prior nonprovisional application contained a declaration as required, the application being filed is by all or fewer than all the inventors named in the prior application, there is no new matter in the application being filed, and a copy of the executed declaration filed in the prior application (showing the signature or an indication thereon that it was signed) is submitted. The copy must be accompanied by a statement requesting deletion of the names of person(s) who are not inventors of the application being filed. If the declaration in the prior application was filed under § 1.47 then a copy of that declaration must be filed accompanied by a copy of the decision granting § 1.47 status or, if a nonsigning person under § 1.47 has subsequently joined in a prior application, then a copy of the subsequently executed declaration must be filed. See 37 CFR 1.63(d).*

**NOTE:** *A declaration filed to complete an application must be executed, identify the specification to which it is directed, identify each inventor by full name, including the family name, and at least one given name without abbreviation together with any other given name or initial, and the residence, post office address and country of citizenship of each inventor and state whether the inventor is a sole or joint inventor. 37 CFR 1.63(a)(1)-(4).*

- Enclosed

Executed by

*(check all applicable boxes)*

- inventor(s).
- legal representative of inventor(s). 37 CFR 1.42 or 1.43.
- joint inventor or person showing a proprietary interest on behalf of inventor who refused to sign or cannot be reached.
- This is the petition required by 37 CFR 1.47 and the statement required by 37 CFR 1.47 is also attached. See item 13 below for fee.

- Not Enclosed.

**NOTE:** *Where the filing is a completion in the U.S. of an International Application, or where the completion of the U.S. application contains subject matter in addition to the International Application, the application may be treated as a continuation or continuation-in-part, as the case may be, utilizing ADDED PAGE FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION CLAIMED.*

- Application is made by a person authorized under 37 C.F.R. 1.41(c) on behalf of all the above named inventor(s).

*(The declaration or oath, along with the surcharge required by 37 CFR 1.16(e), can be filed subsequently).*

*NOTE: It is important that all the correct inventor(s) are named for filing under 37 CFR 1.41(c) and 1.53(b).*

Showing that the filing is authorized.  
*(not required unless called into question. 37 CFR 1.41(d))*

## 6. Inventorship Statement

**WARNING:** *If the named inventors are each not the inventors of all the claims an explanation, including the ownership of the various claims at the time the last claimed invention was made, should be submitted.*

The inventorship for all the claims in this application are:

The same.  
**or**  
 Not the same. An explanation, including the ownership of the various claims at the time the last claimed invention was made,  
 is submitted.  
 will be submitted.

## 7. Language

**NOTE** *An application including a signed oath or declaration may be filed in a language other than English. An English translation of the non-English language application and the processing fee of \$130.00 required by 37 CFR 1.17(k) is required to be filed with the application, or within such time as may be set by the Office. 37 CFR 1.52(d).*

English  
 Non-English

The attached translation includes a statement that the translation is accurate. 37 C.F.R. 1.52(d).

## 8. Assignment

An assignment of the invention to Shipley Company, L.L.C. of  
Marlborough, Massachusetts 01752

is attached. A separate  "COVER SHEET FOR ASSIGNMENT (DOCUMENT) ACCOMPANYING NEW PATENT APPLICATION" or  FORM PTO 1595 is also attached.  
 was filed in the parent application  
 will follow.

**NOTE:** *"If an assignment is submitted with a new application, send two separate letters-one for the application and one for the assignment" Notice of May 4, 1990 (1114 O.G. 77-78).*

**WARNING:** *A newly executed "STATEMENT UNDER 37 CFR 3.73(b)" must be filed when a continuation-in-part application is filed by an assignee. Notice of April 30, 1993, 1150 O.G. 62-64.*

**9. Certified Copy**

Certified copy(ies) of application(s)

<b>Country</b>	<b>Appln. No.</b>	<b>Filed</b>

from which priority is claimed

is enclosed.  
 was filed.  
 will follow.

*NOTE: The foreign application forming the basis for the claim for priority must be referred to in the oath or declaration 37 CFR 1.55(a) and 1.63.*

*NOTE: This item is for any foreign priority for which the application being filed directly relates. If any parent U.S. application or International Application from which this application claims benefit under 35 U.S.C. 120 is itself entitled to priority from a prior foreign application, then complete item 18 on the ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED.*

**10. Fee Calculation (37 C.F.R. 1.16)**

A.  Regular application

**CLAIMS AS FILED**

<b>Claims</b>	<b>Number Filed</b>	<b>Basic Fee Allowance</b>	<b>Number Extra</b>	<b>Rate</b>	<b>Basic Fee 37 C.F.R. 1.16(a) \$710.00</b>
<b>Total Claims (37 CFR 1.16(c))</b>	12	- 20 =	0	x \$ 18.00	\$0
<b>Independent Claims (37 CFR 1.16(b))</b>	2	- 3 =	0	x \$78.00	\$0
<b>Multiple Dependent Claim(s), if any (37 CFR 1.16(d))</b>			+	\$260.00	\$0

Amendment canceling extra claims is enclosed.  
 Amendment deleting multiple-dependencies is enclosed.  
 Fee for extra claims is not being paid at this time.

*NOTE: If the fees for extra claims are not paid on filing they must be paid or the claims cancelled by amendment, prior to the expiration of the time period set for response by the Patent and Trademark Office in any notice of fee deficiency. 37 CFR 1.16(d).*

Filing Fee Calculation      \$ 710.00

B.	<input type="checkbox"/>	Design application (\$330.00—37 CFR 1.16(f))	Filing Fee Calculation	\$ _____
C.	<input type="checkbox"/>	Plant application (\$540.00—37 CFR 1.16(g))	Filing Fee Calculation	\$ _____

**11. Small Entity Statement(s)**

Statement(s) that this is a filing by a small entity under 37 CFR 1.9 and 1.27 is (are) attached.

**WARNING:** *"Status as a small entity must be specifically established in each application or patent in which the status is available and desired. Status as a small entity in one application or patent does not affect any other application or patent, including applications or patents which are directly or indirectly dependent upon the application or patent in which the status has been established. The refiling of an application under § 1.53 as a continuation, division, or continuation-in-part (including a continued prosecution application under § 1.53(d)), or the filing of a reissue application requires a new determination as to continued entitlement to small entity status for the continuing or reissue application. A nonprovisional application claiming benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) of a prior application, or a reissue application may rely on a statement filed in the prior application or in the patent if the nonprovisional application or the reissue application includes a reference to the statement in the prior application or in the patent or includes a copy of the statement in the prior application or in the patent and status as a small entity is still proper and desired. The payment of the small entity basic statutory filing fee will be treated as such a reference for purposes of this section." 37 CFR 1.28(a)(2)*

(complete the following, if applicable)

Status as a small entity was claimed in prior application \_\_\_\_\_, filed on \_\_\_\_\_ from which benefit is being claimed for this application under:

35 U.S.C. §       119(e),  
 120,  
 121,  
 365(c),

and which status as a small entity is still proper and desired.

A copy of the statement in the prior application is included.  
Filing Fee Calculation (50% of A, B or C above)      \$ \_\_\_\_\_

**NOTE:** Any excess of the full fee paid will be refunded if a small entity status is established refund request are filed within 2 months of the date of timely payment of a full fee. The two-month period is not extendable under § 1.136 37 CFR 1.28(a).

**12. Request for International-Type Search (37 C.F.R. 1.104(d))**  
(complete, if applicable)

Please prepare an international-type search report for this application at the time when national examination on the merits takes place.

**13. Fee Payment Being Made at This Time**

Not Enclosed

No filing fee is to be paid at this time.

*(This and the surcharge required by 37 C.F.R. 1.16(e) can be paid subsequently.)*

Enclosed

Filing fee \$ \_\_\_\_\_

Recording assignment  
(\$40.00; 37 C.F.R. 1.21(h))  
(See attached "COVER SHEET FOR  
ASSIGNMENT ACCOMPANYING NEW  
APPLICATION.") \$ \_\_\_\_\_

Petition fee for filing by other than  
all the inventors or person on behalf  
of the inventor where inventor  
refused to sign or cannot be reached  
(\$130.00; 37 C.F.R. 1.47 and 1.17(i)) \$ \_\_\_\_\_

For processing an application with a  
specification in a non-English language  
(\$130.00; 37 C.F.R. 1.52(d) and 1.17(k)) \$ \_\_\_\_\_

Processing and retention fee  
(\$130.00; 37 C.F.R. 1.53(d) and 1.21(l)) \$ \_\_\_\_\_

Fee for international-type search report  
(\$40.00; 37 C.F.R. 1.21(e)) \$ \_\_\_\_\_

**NOTE:** 37 CFR 1.21(l) establishes a fee for processing and retaining any application that is abandoned for failing to complete the application pursuant to 37 CFR 1.53(f) and this, as well as the changes to 37 CFR 1.53 and 1.78(a)(1), indicate that in order to obtain the benefit of a prior U.S. application, either the basic filing fee must be paid, or the processing and retention fee of § 1.21(l) must be paid, within 1 year from notification under § 53(f).

Total Fees Enclosed \$ \_\_\_\_\_

**14. Method of Payment of Fees**

Check in the amount of \$\_\_\_\_\_

Charge Account No. \_\_\_\_\_ in the amount of \$\_\_\_\_\_.  
A duplicate of this transmittal is attached.

**15. Authorization to Charge Additional Fees**

**WARNING:** If no fees are to be paid on filing, the following items should not be completed

**WARNING:** Accurately count claims, especially multiple dependent claims, to avoid unexpected high charges, if extra claim charges are authorized.

The Commissioner is hereby authorized to charge the following additional fees by this paper and during the entire pendency of this application to Account No. 04-1105.

37 C.F.R. 1.16(a), (f) or (g) (filing fees)  
 37 C.F.R. 1.16(b), (c) and (d) (presentation of extra claims)

NOTE. Because additional fees for excess or multiple dependent claims not paid on filing or on later presentation must only be paid or these claims cancelled by amendment prior to the expiration of the time period set for response by the PTO in any notice of fee deficiency (37 CFR 1.16(d)), it might be best not to authorize the PTO to charge additional claim fees, except possibly when dealing with amendments after final action.

37 C.F.R. 1.16(e) (surcharge for filing the basic filing fee and/or declaration on a date later than the filing date of the application)  
 37 CFR 1.17(a)(1)-(5) (extension fees pursuant to § 1.136(a)).  
 37 C.F.R. 1.17 (application processing fees)

NOTE "A written request may be submitted in an application that is an authorization to treat any concurrent or future reply, requiring a petition for an extension of time under this paragraph for its timely submission, as incorporating a petition for extension of time for the appropriate length of time. An authorization to charge all required fees, fees under § 1.17, or all required extension of time fees will be treated as a constructive petition for an extension of time in any concurrent or future reply requiring a petition for an extension of time under this paragraph for its timely submission. Submission of the fee set forth in § 1.17(a) will also be treated as a constructive petition for an extension of time in any concurrent reply requiring a petition for an extension of time under this paragraph for its timely submission." 37 CFR 1.136(a)(3).

37 C.F.R. 1.18 (issue fee at or before mailing of Notice of Allowance, pursuant to 37 C.F.R. 1.311(b))

NOTE. Where an authorization to charge the issue fee to a deposit account has been filed before the mailing of a Notice of Allowance, the issue fee will be automatically charged to the deposit account at the time of mailing the notice of allowance. 37 CFR 1.311(b).

NOTE. 37 CFR 1.28(b) requires "Notification of any change in status resulting in loss of entitlement to small entity status must be filed in the application . . . prior to paying, or at the time of paying, . . . issue fee." From the wording of 37 CFR 1.28(b), (a) notification of change of status must be made even if the fee is paid as "other than a small entity" and (b) no notification is required if the change is to another small entity.

## 16. Instructions as to Overpayment

NOTE. ". . . Amounts of twenty-five dollars or less will not be returned unless specifically requested within a reasonable time, nor will the payer be notified of such amounts. amounts over twenty-five dollars may be returned by check or, if requested, by credit to a deposit account." 37 CFR 1.26(a)

Credit Account No. 04-1105.

Refund

S. Matthew Cairns  
SIGNATURE OF PRACTITIONER

Reg. No. 42,378

S. Matthew Cairns  
(type or print name of practitioner)

c/o EDWARDS & ANGELL, LLP  
Dike, Bronstein, Roberts & Cushman, IP Group

Tel. No.: (508) 229-7545

130 Water Street  
P.O. Address

Customer No.:

Boston, MA 02109

**Incorporation by reference of added pages**

*(check the following item if the application in this transmittal claims the benefit of prior U.S. application(s) (including an international application entering the U.S. stage as a continuation, divisional or C-I-P application) and complete and attach the ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED)*

Plus Added Pages for New Application Transmittal Where Benefit of Prior U.S. Application(s) Claimed

Number of pages added \_\_\_\_\_

Plus Added Pages for Papers Referred to in Item 4 Above

Number of pages added \_\_\_\_\_

Plus added pages deleting names of inventor(s) named on prior application(s) who is/are no longer inventor(s) of the subject matter claimed in this application.

Number of pages added \_\_\_\_\_

Plus "Assignment Cover Letter Accompanying New Application"

Number of pages added \_\_\_\_\_

**[X] Statement Where No Further Pages Added**

*(if no further pages form a part of this Transmittal, then end this Transmittal with this page and check the following item)*

This transmittal ends with this page.

Express Mail Label No. EK929188029US  
Docket No. 50622

**U.S. PATENT APPLICATION**

Title: **MANUFACTURING PROCESS BILLING SYSTEM**

Inventors: Brian McDAVITT  
Charles R. SZMANDA  
James G. SHELNUT

Attorney: S. Matthew Cairns (Reg. No. 42,378)  
c/o EDWARDS & ANGELL, LLP  
Dike, Bronstein, Roberts & Cushman, IP Group  
130 Water Street  
Boston, MA 02109  
Telephone: (508) 229-7545

**MANUFACTURING PROCESS  
BILLING SYSTEM**

**BACKGROUND**

The following invention relates to a system and method for improving the efficiency of a manufacturing process and, in particular, to a system and method that enables manufacturers to efficiently select and use materials in a manufacturing process.

The manufacture of goods generally requires the selection of suitable materials and knowledge of a process for converting the materials into the desired goods. For example, the manufacturing of integrated circuits requires the manufacturer to select the appropriate wafers and chemicals and process the wafers using the chemicals in a manner that produces the desired integrated circuits. A challenge in most manufacturing processes is to select the type and quantity of materials so as to minimize the resulting cost of the manufactured goods. This is especially the case in situations, such as the manufacturer of integrated circuits, where the cost of the materials is a significant percentage of the overall cost of the final product. In these situations, any materials wasted would cause the cost-per-unit-manufactured to become unacceptably high.

In many manufacturing processes, the responsibility of selecting the appropriate type and quantity of materials rests on the manufacturer. For example, if a manufacturer desires to produce integrated circuits, then the manufacturer must determine which wafers and chemicals it requires, and in what quantity, as well as determine the optimal manufacturing process that should be used. In many cases, however, it is the materials provider and not the manufacturer that knows which are the best materials to use and what are the latest and most efficient

processing techniques. As a result, the manufacturer either may resort to trial and error to optimize the manufacturing process or use a non-optimal process. In either case, materials are wasted resulting in an increase in the cost-per-goods produced.

Furthermore, in many instances, the materials providers are adversely affected by a manufacturer's incorrect selection and inefficient use of materials. First, if the manufacturer orders from a materials provider the incorrect materials for a certain manufacturing process, the material provider will often have to bear at least a part of the cost of providing the proper materials to the manufacturer in order to maintain goods customer relations. Also, to reduce the cost of the manufactured products, the manufacturer often tries to reduce the amount of materials used which necessarily results in decreased revenues to the material providers. Thus, the improper and inefficient use of materials in a manufacturing process results in an increased cost-per-unit-manufactured as well as adversely impacting the revenue stream that materials provider receive from the sale of materials.

Accordingly, it is desirable to provide a system and method that enables manufacturers to efficiently select and use materials in a manufacturing process and that also stabilizes the material costs associated with the manufactured goods.

### **SUMMARY OF THE INVENTION**

The present invention is directed to overcoming the drawbacks of the prior art. Under the present invention a method and system is provided for improving the efficiency of a process for manufacturing a product and begins with the step of receiving from a manufacturer a desire to manufacture a certain amount of the product. Next, the amount of materials that is required to produce the amount of product is determined. Next, the process for manufacturing the number

of products is determined. Next, a cost to manufacture the amount of product based on the amount of materials and the manufacturing process is calculated. The manufacturer is then provided with a description of the manufacturing process and the cost to manufacture the number of products. Finally, a payment is received from the manufacturer that is proportional to the cost to manufacture the number of products.

In an exemplary embodiment, the amount of materials that are required to produce the number of products is provided to the manufacturer.

In another exemplary embodiment, the manufacturer is provided with a tool that is required to implement the manufacturing process.

Accordingly, a method and system is provided that enables manufacturers to efficiently select and use materials in a manufacturing process and that also stabilizes the material costs associated with the manufactured goods

The invention accordingly comprises the features of construction, combination of elements and arrangement of parts that will be exemplified in the following detailed disclosure, and the scope of the invention will be indicated in the claims. Other features and advantages of the invention will be apparent from the description, the drawings and the claims.

#### **DESCRIPTION OF THE DRAWINGS**

For a fuller understanding of the invention, reference is made to the following description taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a block diagram of a manufacturing process billing system according to the present invention.

**DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS**

Referring now to FIG. 1, there is shown a block diagram of a manufacturing process billing system 1 according to the present invention. System 1 includes a product database 3 that stores information regarding different manufactured products including, but not limited to, the materials that are used to manufacture each product, the cost of such materials and a description of the process used to manufacture each of the products using the materials. In an exemplary embodiment, the process included in product database 3 is an optimum process for manufacturing a particular product given a set of materials wherein such process is the intellectual property of the supplier of the materials.

For example, if system 1 is being applied to improve the efficiency of manufacturing wafers and integrated circuits, then product database 3 will include a list of various products such as DRAMS, processors magnetic thin film heads, photomasks and other microelectronic devices. In addition, product database 3 will include a listing of the materials required to manufacture each of the products. For example, associated with a particular integrated circuit structure, product database 3 will store a material list that includes positive- or negative-working photoresist, developers, anti-reflective coatings, the materials required to manufacture the integrated circuit structure, as well as the amounts of these materials required. Product database 3 also includes a description of a process that is used to manufacture the integrated circuit structure which may be, for example, wafer spin speed for photoresist application, softbake times and temperatures, exposure and post-exposure wavelength and doses and development time and temperatures. Finally, product database 3 stores the materials cost required to produce the

associated product. In an exemplary embodiment, the material cost is provided on a per-product basis so that system 1 can determine the total cost to produce a number of units of the product.

A manufacturer seeking the cost to manufacture a product on a per-product basis accesses system 1 via a manufacturer access device 7 that may be, by way of non-limiting example, a personal computer that accesses system 1 through the Internet uses well known methods. Upon accessing system 1, access device 7 interfaces with a manufacturer interface module 9 and provides interface module 9 with the pricing request for materials and manufacturing process information to produce a specified quantity of the particular product. Interface module 9 then communicates the manufacturer's pricing request to a pricing engine 5 that in turn searches product database 3 for an entry that matches the particular product. Upon finding a match, pricing engine 5 retrieves the material list required to produce the particular product and the per-unit cost to produce the product given the materials required. Based on the per-unit cost, pricing engine 5 then calculates the total cost to manufacture the specified quantity of the particular product and provides this cost, or an amount that is proportional to the cost to reflect a pricing discount or premium, to manufacturer access device 7 via interface module 9.

If the manufacturer decides to manufacture the specified quantity of the particular product based on the per-unit pricing provided by system 1, the manufacturer issues a purchase request to manufacturer interface module 9 for the materials and manufacturing process information necessary to manufacture the particular product at the per-unit pricing specified. Interface module 9 forwards the purchase request to delivery manager 11. Delivery manager 11 then accesses product database 3 to determine the type and quantity of materials required to manufacture the number of products included in the purchase request. Delivery manager 11 then

issues a delivery order to materials warehouse 13 directing materials warehouse 13 to deliver the quantity of materials required to manufacture the specified number of products to a location 15 specified in the purchase request, for example, a manufacturing plant. Thus, system 1 provides the manufacturer with the correct selection and quantity of materials enabling the manufacturer to produce the desired number of products.

Furthermore, delivery manager 11 retrieves from product database 3 the manufacturing process information for the particular product and forwards the information to manufacturer access device 7 via interface module 9. By using the manufacturing process information together with the materials selection supplied by system 1, the manufacturer is assured that it is employing the optimum manufacturing process to produce the desired products.

After receiving the materials from materials warehouse 13, the manufacturer pays for the materials by paying the specified per-unit price multiplied by the number of product units the manufacturer produced. In an exemplary embodiment, payment may be sent electronically to system 1 via manufacturer interface module 9.

System 1 may be implemented by a materials provider for the purpose of streamlining the interaction with its customer base and more efficiently providing its customers with materials and manufacturing process information. Alternatively, system 1 may be implemented by an entity that distributes materials on behalf of a plurality of materials providers. In this embodiment, product database 3 includes a listing of products that are manufactured using materials supplied by the plurality of materials suppliers, together with the per-unit cost of such materials and a description of the manufacturing process used to produce such products. When system 1 receives a purchase request from a manufacturer for materials for producing a particular

product, delivery manager 11 communicates with the materials provider that provides the materials required to manufacture the particular product directing the materials provider to ship the required materials to location 15.

In an exemplary embodiment, product database 3 also includes a reference to a tool or piece of equipment necessary to implement the manufacturing process used to produce each particular product listed in product database 3. In this case, when the manufacturer communicates the purchase request to interface module 9, the manufacturer specifies that it also desires to procure the equipment necessary to implement the manufacturing process. Alternatively, interface module 9 may query the manufacturer as to whether it desires to procure the manufacturing equipment as well as the required materials. In either case, delivery manager 11 causes the appropriate equipment, as specified in product database 3, to be delivered to location 15 together with the materials.

In addition to accessing system 1 to determine the cost to manufacture a product on a per-product basis, a manufacturer may access system 1 to determine whether a process exists to accomplish a desired manufacturing objective such as, by way of non-limiting example, the manufacture of a custom chemical product. In this case, the manufacturer provides interface module 9 with a process request that identifies the objectives and results the manufacturer desires to achieve. Interface module 9 then communicates the manufacturer's process request to pricing engine 5 that in turn searches product database 3 for a process that meets the manufacturer's objectives. Upon finding a suitable process, pricing engine 5 retrieves the process, together with the materials list and cost required to implement the process, and provides this information in response to the manufacturer's process request via interface module 9. In addition, other

information may be stored in product database 3 and provided to the manufacturer including, but not limited to, the delivery time for the materials needed to perform the process and descriptions of other manufacturing processes that may be of interest to the manufacturer based on the manufacturer's process request. In this way, system 1 may be used by manufacturers to identify custom manufacturing processes for solving specific manufacturing needs.

The present invention may also be applied in contexts other than manufacturing processes such as, by way of non-limiting example, for providing home improvement advice in which a contractor provides system 1 with the dimensions and decor elements for a particular construction project and system 1 provides the contractor with a suggested materials list, layout and preferred construction techniques for completing the project.

Thus, under the present invention, the efficiency of the manufacturing process is improved. First, manufacturers no longer have to use trial an error in selecting the best materials and/or manufacturing process to use because this information is provided to them by the materials providers. Accordingly, manufacturing waste as a result of improper material and process selection is greatly reduced or eliminated. Furthermore, by providing the manufacturers with materials on a per-unit produced price, as opposed to requiring the manufacturers to specify and purchase an amount of materials directly, the manufacturer's budgeting process is greatly simplified. Also, because the selection of the materials and manufacturing process to be used is made by the materials provider, the entity best situated to make such a selection, the materials provider can more efficiently distribute materials by reducing waste resulting from the manufacturer's selection errors. Finally, because the materials provider is being compensated for each product unit produced by the manufacturer using the materials and manufacturing process

information supplied by the materials provider, the materials provider's revenue would not be adversely impacted even if it provides the manufacturer with a more efficient manufacturing process that requires less materials to implement.

It will thus be seen that the objects set forth above, among those made apparent from the preceding description, are efficiently attained and, since certain changes may be made in carrying out the above process, in a described product, and in the construction set forth without departing from the spirit and scope of the invention, it is intended that all matter contained in the above description shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention, which, as a matter of language, might be said to fall therebetween.

**CLAIMS**

1. A method for improving the efficiency of manufacturing a product, comprising the steps of:

receiving from a manufacturer a desire to manufacture a number of said products;  
determining an amount of materials required to produce said number of products;  
determining a process for manufacturing said number of products;  
calculating a cost to manufacture said number of products based on said amount of materials  
and said process;  
providing to said manufacturer said process and said cost to manufacture said number of  
products.

2. The method of claim 1, further comprising the step of:

receiving from said manufacturer a payment proportional to said cost to manufacture said  
number of products.

2. The method of claim 1, further comprising the step of:

providing said amount of materials to said manufacturer.

3. The method of claim 1, wherein said process requires a tool, said method further  
comprising the step of:

providing to said manufacturer said tool.

4. The method of claim 1, wherein said process for manufacturing said number of products  
is an optimum process.

5. The method of claim 1, wherein said materials is provided by a material provider and said process for manufacturing said number of products is the intellectual property of said materials provider.

6. A system for improving the efficiency of manufacturing a product, comprising:  
a product database storing a plurality of products, said product database including a material list and a process description for manufacturing each of said plurality of products;  
a pricing engine, said pricing engine receiving a manufacturer's desire to manufacture a number of said products, said pricing engine accessing said product database for determining an amount of materials, a process and a cost for manufacturing said number of products.

7. The system of claim 6, further comprising a manufacturer interface module, said manufacturer interface module providing to said manufacturer said amount of materials and said process for manufacturing said number of products.

8. The system of claim 7, wherein said manufacturer interface module receives from said manufacturer a payment proportional to said cost to manufacture said number of products.

9. The system of claim 6, further comprising a delivery manager, said delivery manager causing said amount of materials to be delivered to said manufacturer.

10. The system of claim 9, wherein said delivery manager causes a tool required to perform said process to be delivered to said manufacturer.

11. The system of claim 6, wherein said process for manufacturing said number of products is an optimum process.

12. The method of claim 6, wherein said materials is provided by a material provider and said process for manufacturing said number of products is the intellectual property of said materials provider.

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**ABSTRACT**

A method and system is provided for improving the efficiency of a process for manufacturing a product and begins with the step of receiving from a manufacturer a desire to manufacture a number of said products. Next, the amount of materials that is required to produce the number of products is determined. Next, the optimum process for manufacturing the number of products is determined. Next, a cost to manufacture the number of products based on the amount of materials and the optimum process is calculated. The manufacturer is then provided with the optimum process and the cost to manufacture the number of products. Finally, a payment is received from the manufacturer that is proportional to the cost to manufacture the number of products.

FIG. 1

